US Dept. Commerce / National Oceanic and Atmospheric Administration
National Marine Fisheries Service / Auke Bay Laboratory / Little Port Walter Field Station

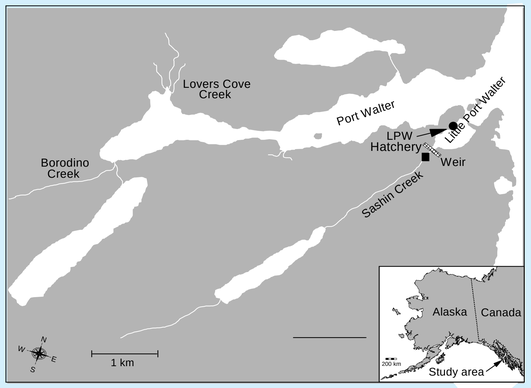
# Research on Steelhead and Rainbow Trout

## Projects Initiated from 1996 through 2001

1. Effects of Inbreeding and Outbreeding Depression on Important Life History Characters in Sashin Creek Steelhead
2. Effects of 70 years of Freshwater Sequestration on Important Life History Characters Utilizing Wild and Captive Environments
3. Comparison of Genetic Variability Between Landlocked and Anadromous Populations derived from the same source
4. Effects of Small Founder Populations on Genetic Variability
5. Inheritance of Microsatellite Loci
6. Effects of Long-Term Straying on Genetic Variability
7. Survival of Wild Steelhead Smolts Measured By Passive Integrated Transponder Tags
8. Survival, Length of Residence and Repeat Spawning of Wild Steelhead in Sashin Creek
9. Comparison of Wild Smolt to Adult Survival Between Smolts Produced by Anadromous or Landlocked Populations
10. Comparison of Spawning Behavior and Mating Success Between Captive and Ranched Steelhead
11. Comparison of Fry Production Between and Among Captive and Ranched Steelhead

## Management/Conservation Issue Addressed

- Longterm Maintenance of Endangered Populations
- Impacts of Hatcheries on Wild Fish
- Basic Life History Research on Steelhead and Rainbow Trout for Appropriate ESU Determinations
- Rebuilding Endangered Populations




## Results to Date

Little evidence of outbreeding depression as measured in incubation and juvenile survival or growth during the freshwater phase for two brood years.

Higher freshwater mortality during first winter in inbred groups.

Relatively small loss of genetic variation after 60 years in populations initiated with 50 to 85 fish.

Substantial loss of genetic variability for fish maintained in freshwater however mechanism of loss unknown - probably due to genetic bottleneck caused by small founder population.

Microsatellite loci used in this study are inherited in Mendelian fashion, however, null alleles, tandemly duplicated loci, and size homoplasy in some loci can result in inappropriately low estimates of heterozygosity and genetic variation.

Preliminary results indicate that extensive genetic replacement of anadromous genotypes by straying of genotypes from the upper river has not occurred as might be predicted.

Male steelhead adults enter Sashin Creek two weeks earlier, on average, than females and spend three times longer in freshwater.

Rainbow trout landlocked for 70 years still produce substantial, although significanly fewer, numbers of smolts when compared to steelhead.

Marine survival was significantly higher for smolts produced from anadromous parents than those produced from parents of freshwater origin.